

107525406

BT01 Rec'd PCT/PTC 23 FEB 2005

IN THE CLAIMS

This is a complete and current listing of the claims, marked with status identifiers in parentheses. The following listing of claims will replace all prior versions and listings of claims in the application.

1. (Original) A method of growing an AlGa_N semiconductor layer structure, the method comprising the step of:

(a) supplying ammonia, gallium and aluminium to a growth chamber thereby to grow a first (Al,Ga)_N layer having a non-zero aluminium mole fraction by MBE over a substrate disposed in the growth chamber; wherein ammonia is supplied at a beam equivalent pressure of at least 1×10^{-4} mbar, gallium is supplied at a beam equivalent pressure of at least 1×10^{-8} mbar and aluminium is supplied at a beam equivalent pressure of at least 1×10^{-8} mbar.

2. (Original) A method as claimed in claim 1 wherein ammonia is supplied at a beam equivalent pressure in the range from 1×10^{-4} mbar to 2×10^{-2} mbar.

3. (Currently Amended) A method as claimed in claim 1 ~~or 2~~ wherein the substrate temperature is within the range from 850°C to 1050°C.

4. (Currently Amended). A method as claimed in claim 1, ~~2 or 3~~ wherein gallium is supplied at a beam equivalent pressure in the range from 1×10^{-8} mbar to 1×10^{-4} mbar.

5. (Currently Amended) A method as claimed in claim 1, ~~2, 3 or 4~~ wherein aluminium is supplied at a beam equivalent pressure in the range from 1×10^{-8} mbar to 1×10^{-4} mbar.

6. (Original) A method as claimed in claim 5 wherein aluminium is supplied at a beam equivalent pressure in the range from 1×10^{-8} mbar to 2×10^{-7} mbar.

7. (Currently Amended) A method as claimed in ~~any preceding claim~~ claim 1 and comprising the further step of:

(b) varying the supply rate of gallium and/or aluminium thereby to grow a second (Al,Ga)N layer by MBE over the first (Al,Ga)N layer, the second (Al, Ga)N layer having a different aluminium mole fraction from the first (Al,Ga)N layer.

8. (Original) A method as claimed in claim 7 wherein step (b) comprises reducing the supply rate of aluminium to zero whereby the second (Al,Ga)N layer is a GaN layer.

9. (Currently Amended) A method as claimed in ~~any preceding~~

~~claim-claim 1~~ and comprising the further step of:

(c) varying the supply rate of gallium and/or aluminium thereby to grow a third (Al,Ga)N layer by MBE over the second (Al,Ga)N layer, the third (Al,Ga)N layer having a different aluminium mole fraction from the second (Al,Ga)N layer.

10. (Original) A method as claimed in claim 9 wherein the third (Al,Ga)N layer has substantially the same aluminium mole fraction as the first (Al,Ga)N layer.

11. (Currently Amended) A method as claimed in ~~any preceeding claim-claim 1~~ wherein the substrate comprises an (In,Ga)N layer.

12. (Original) A method as claimed in claim 11 wherein the substrate is an InGaN substrate.

13. (Original) A method as claimed in claim 11 wherein the substrate is a GaN substrate.

14. (Original) A method as claimed in claim 11 wherein the substrate comprises an (In,Ga)N epitaxial layer disposed over a base substrate.

15. (Currently Amended) A method as claimed in ~~any preceeding claim-claim 1~~ and comprising the further step of supplying a

dopant during at least ~~one of step (a), step (b) or step (c).~~

16. (Currently Amended) A method as claimed in ~~any preceeding~~
~~elaim~~ claim 1 wherein the first (Al,Ga)N layer has an aluminium
mole fraction of greater than 0.01.

17. (Currently Amended) A method as claimed in ~~any preceeding~~
~~elaim~~ claim 1 wherein the first (Al,Ga)N layer has an aluminium
mole fraction of less than 0.2.

18. (Currently Amended) An (Al,Ga)N layer grown by a method as
defined in ~~any of elaim 1 to 17~~ claim 1.

19. (Currently Amended) An (Al,Ga)N multilayer structure grown by a
method as defined in ~~any of claims 7 to 10~~ claim 7.

20. (Original) An optoelectronic device comprising an (Al,Ga)N layer as
defined in claim 18.

21. (Original) An optoelectronic device comprising an (Al,Ga)N
multilayer structure as defined in claim 19.